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FURTHER OBSERVATIONS ON THE EFFECT OF SMALL REPEATED DOSES OF PHENOTHIAZINE ON STRONGYLID INFECTION IN THE HORSE

By

T. E. GIBSON

VETERINARY LABORATORY, MINISTRY OF AGRICULTURE AND FISHERIES, WEYBRIDGE.

In a previous paper, Gibson (1945), the results of experiments were recorded showing that strongylid worms were not eliminated from horses which received one gramme of phenothiazine daily for 30 days but that the treatment did result in the inhibition of egg laying by the worms, this effect being observed for as long as 35 days after the administration of the drug had ceased. It was shown also that the presence of small amounts of phenothiazine in the faeces of treated horses prevented any strongylid eggs that might be present from developing into third stage larvae. In discussion it was pointed out that the failure to eliminate worms did not altogether invalidate the use of small daily doses of phenothiazine in the control of equine strongylosis since the inhibition of egg production and of larval development would reduce pasture contamination and consequently lower the intake of infective strongylid larvae by grazing animals.

The experiments described in the previous paper involved only short periods of treatment of housed horses and the need was felt for prolonged treatment of both housed horses and horses at pasture before practical recommendations could be made. In this way it would be possible to find out whether inhibition of egg production by the worms could be maintained for long periods without the manifestation of toxic effects in the treated animals, and the experiments described in this paper were designed to obtain information on these points.

Experimental Methods and Results

Two experiments were carried out. The first was an extension of the work described in the previous paper, the period of treatment of a housed horse being prolonged from 30 days to one year so as to observe the effects of prolonged treatment on the worm burden and on the horse. The second was carried out on ponies running at pasture and the observations on egg output in the faeces of the host were supplemented by larval counts on the herbage of the pasture upon which the ponies were grazed.

In all the experiments described in this paper phenothiazine, to which no dispersing or wetting agent had been added, was used and references to phenothiazine throughout are to this form of the anthelmintic.

EXPERIMENT 1: PROLONGED TREATMENT OF A HOUSED HORSE WITH DAILY DOSES OF ONE GRAMME OF PHENOTHIAZINE.

In this experiment a pony, No. 140, was kept continuously in a loose box and each day for a year was given one gramme of phenothiazine mixed with a small quantity of damp bran and oats. Weekly egg counts were carried out during this period and for some three months afterwards, the modified McMaster technique being employed when the count exceeded 100 eggs per gramme and the modified Clayton Lane flotation method when the count was below that level. The results are recorded in Table I and may be summarised as follows:—

During the first four weeks of treatment the faecal egg count fell from 1,400 to two eggs per gramme and then to zero, at which level it remained during the treatment period and for the succeeding five weeks. After this it showed a gradual rise and had reached 500 eggs per gramme by the 13th week after the end of treatment. The pony was examined daily during the whole period of the experiment and no ill-effects as a result of treatment were observed at any time.

TABLE I

SHOWING THE WEEKLY EGG COUNT OF PONY 140 DURING THE PERIOD IN WHICH IT RECEIVED DAILY DOSES OF 1 GRAMME OF PHENOTHIAZINE AND FOR 13 WEEKS AFTERWARDS

Week	Eggs per gramme of faeces	Week	Eggs per gramme of faeces	Week	Eggs per gramme of faeces
1	1,400	23	0	45	0
2	200	24	0	46	0
3	100	25	0	47	0
4	2	26	0	48	0
5	0	27	0	49	0
6	0	28	0	50	0
7	0	29	0	51	0
8	0	30	0	52	0
9	0	31	0	53*	0
10	0	32	0	54	0
11	0	33	0	55	0
12	0	34	0	56	0
13	0	35	0	57	1
14	0	36	0	58	3
15	0	37	0	59	8
16	0	38	0	60	55
17	0	39	0	61	94
18	0	40	0	62	200
19	0	41	0	63	100
20	0	42	0	64	300
21	0	43	0	65	400
22	0	44	0	66	500

* Treatment ceased at the end of week 53.

EXPERIMENT 2: PROLONGED TREATMENT OF HORSES AT PASTURE, WITH DAILY ONE-GRAMME DOSES OF PHENOTHIAZINE.

Two ponies, numbers 126 and 139, were placed on a paddock of area approximately one acre on September 17th, 1946, and remained there without treatment until March 31st, 1947. Each pony was then given one gramme of phenothiazine daily along with a little damp bran and oats, for a period of 12 months which terminated on March 30th, 1948. Following this date the ponies were maintained on the paddock without treatment until September 23rd, 1948. No concentrates were given to the ponies except the small amount in which the phenothiazine was fed each day, nor was hay allowed except for periods in the winter when the herbage was very short, the ponies

subsisting entirely on the herbage of the paddock. This practice encouraged close grazing and ensured the maximum intake of any infective strongylid larvae which were present on the herbage. During the whole of the experimental period faecal egg counts were carried out on both ponies at weekly intervals, the modified McMaster egg counting technique being employed when the count exceeded 100 eggs per gramme and the modified Clayton Lane flotation method when the count was below that level. Every week cultures were prepared from faeces collected from each of the ponies and after incubation at 27 deg. C. for one week the infective strongylid larvae produced in each culture were collected, using the Baermann technique. One hundred of these larvae were differentiated and by dividing the faecal egg count in the same proportion the number of eggs of the different species of strongylid worms per gramme of faeces was ascertained. In addition, weekly estimations of the numbers of strongylid larvae per pound of herbage on the pasture were carried out, using the technique described by Taylor (1939).

The results of the experiments are given in Table II and are summarised in the accompanying diagram in which the combined egg count per gramme of *Trichonema* spp. in the two ponies is shown along with the number of infective larvae of *Trichonema* spp. per pound of herbage on the paddock.

Discussion

Reference to Table II shows that before the ponies were put out to pasture their combined faecal egg count was high, but after they were turned out the count fell from 1910 eggs per gramme of faeces to 130, although no treatment had been given. There can be little doubt that this marked fall in egg count is associated with the change of diet of the host from hay and concentrates to pasture herbage, for when the horses were fed on hay again for a period of some six weeks when snow covered the ground the count rose temporarily to 1360 eggs per gramme, but fell when the animals began to graze again. These striking changes are not easily explained, as it is not likely that the more fluid nature of the faeces of horses at pasture would account for such a significant fall in egg count, and it seems likely that other factors were operating, presumably some effect on the egg laying capacity of the worms.

Further reference to Table II shows that a fortnight after treatment began the egg count had fallen to zero and virtually remained there, never rising above seven eggs per gramme, during the whole 12 months of treatment. The rapid rise in the egg count soon after treatment ceased shows that this fall is due to inhibition of the egg laying capacity of the worms and not to their elimination from the ponies. The herbage larval count, in the period before treatment, shows considerable fluctuation and for six weeks

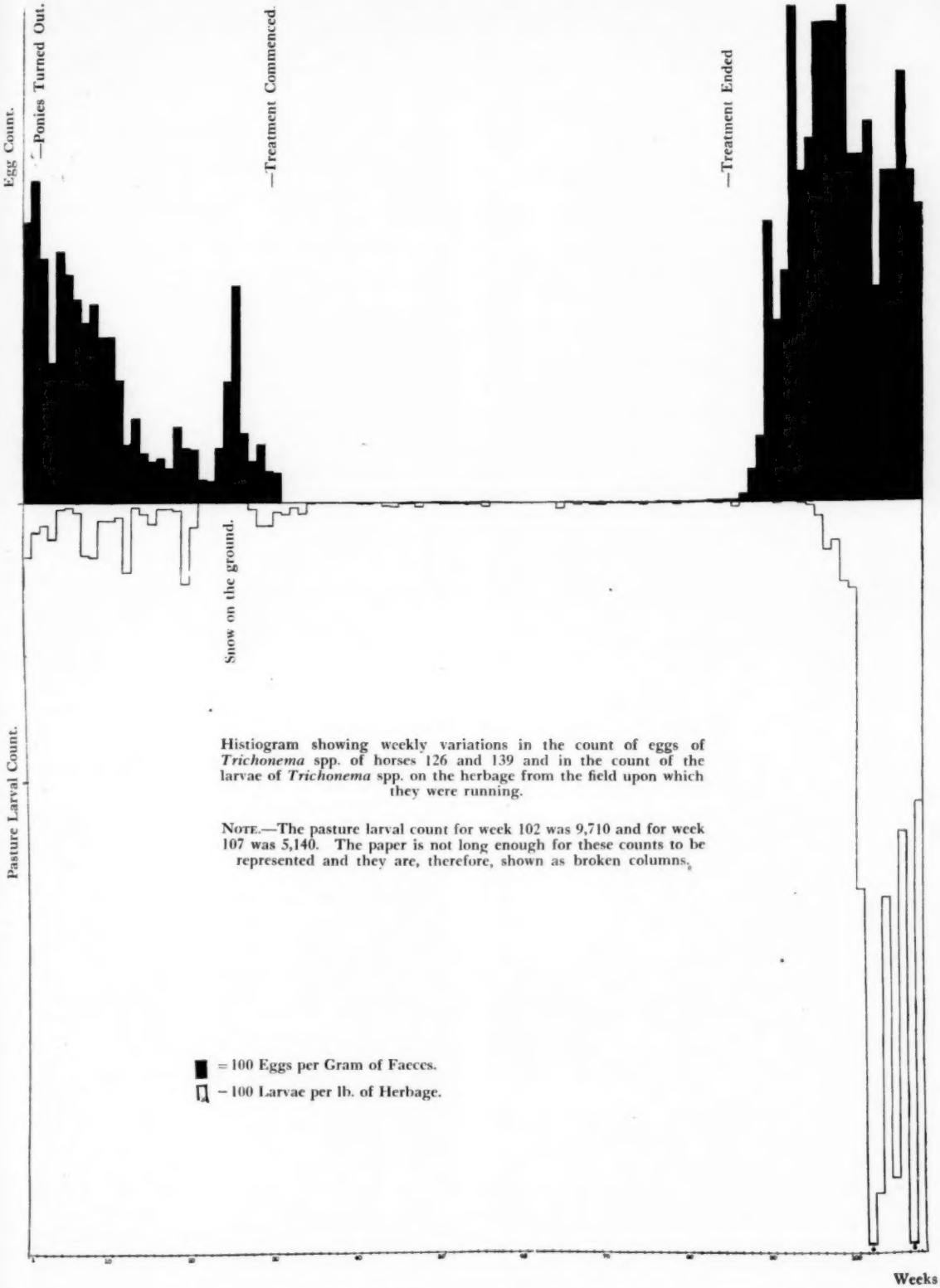
Table II

Showing Weekly Egg Count of the Ponies 126 and 139 of the Larval Count of the Herbage from the Paddock on which they were Running during the Whole Period of Observation

Week	Faecal egg count	Pasture larval count	Week	Faecal egg count	Pasture larval count	Week	Faecal egg count	Pasture larval count
1	1,700	330	37	0	0	73	1	0
2	1,910	180	38	0	0	74	0	0
3	1,480	140	39	0	0	75	1	9
4	850	220	40	0	0	76	0	0
5	1,520	40	41	0	4	77	13	0
6	1,370	30	42	0	3	78	3	0
7	1,230	60	43	0	0	79	4	10
8	1,090	320	44	0	20	80	3	0
9	1,200	330	45	0	25	81	7	0
10	1,000	110	46	0	5	82	7**	0
11	1,000	110	47	1	5	83	12	0
12	740	90	48	1	25	84	12	6
13	350	420	49	1	0	85	15	0
14	510	30	50	2	0	86	15	29
15	300	70	51	2	4	87	53	0
16	250	130	52	1	5	88	202	0
17	270	40	53	1	3	89	400	0
18	210	40	54	1	9	90	1,700	0
19	460	50	55	2	10	91	1,100	7
20	330	490	56	3	22	92	1,400	0
21	320	150	57	1	0	93	3,000	0
22	140	No	58	1	0	94	2,000	7
23	130	count	59	0	0	95	2,200	23
24	330	snow	60	0	0	96	2,900	89
25	730	on	61	0	0	97	2,900	292
26	1,360	ground	62	0	0	98	2,900	233
27	420		63	0	0	99	3,000	488
28	250	40	64	1	0	100	2,100	525
29	350	140	65	0	34	101	2,100	2,350
30	190*	140	66	1	0	102	2,300	9,710
31	180	60	67	0	7	103	1,300	4,190
32	0	70	68	0	0	104	2,000	2,400
33	0	30	69	0	7	105	2,000	4,100
34	0	70	70	2	9	106	2,600	2,000
35	0	6	71	0	0	107	2,000	5,140
36	0	0	72	0	0	108	1,800	1,820

Faecal egg count = Eggs *Trichonema* spp. per gramme of faeces in horses 126 and 139.
Pasture larval count = Number of larvae of *Trichonema* spp. per pound of herbage on the field in which the ponies were running.

* Treatment began at this point.
** Treatment ceased at this point.



Histiogram showing weekly variations in the count of eggs of *Trichonema* spp. of horses 126 and 139 and in the count of the larvae of *Trichonema* spp. on the herbage from the field upon which they were running.

NOTE.—The pasture larval count for week 102 was 9,710 and for week 107 was 5,140. The paper is not long enough for these counts to be represented and they are, therefore, shown as broken columns.

during the severe winter of 1946-47 no counts were made, collection of the herbage being rendered impossible by the presence of snow on the ground, but generally speaking, the counts were low. The variability of the counts is no doubt due to the habit of horses of passing their faeces in heaps in certain parts of a field and grazing in others. A local concentration of larvae results in the neighbourhood of the heaps of faeces and considerable variation in the herbage larval count may result according as a collector passes very near to or some distance away from such a heap.

During the whole period before treatment the weather was extremely cold and was unfavourable for larval development and it will be seen from the diagram that the counts in the pre-treatment period were low. It is remarkable that six weeks after treatment began the herbage larval count fell to zero and remained low, never rising above 30 larvae per pound for the rest of the treatment period and for some 13 weeks afterwards. This fall was undoubtedly due to larvae having been consumed by the horses in grazing and demonstrates the soundness of the recommendation of alternate grazing with cattle or sheep for keeping down the level of larval infestation on the herbage of horse pastures.

Unfortunately, on two occasions untreated horses broke into the paddock from an adjoining field and faeces passed by them were no doubt responsible for some of the relatively high larval counts in the herbage during the treatment period. It will be observed that some 13 weeks after treatment ceased the larval count began to rise rapidly and subsequently reached a very high level. These high larval counts undoubtedly refer to the high level of egg production by the worms, accompanied by a period of mild, wet weather highly favourable to larval development.

The experiment gives a clear demonstration that daily one gramme doses of phenothiazine make it possible to keep the egg counts of horses at pasture down to zero, or nearly so, and also to effect a corresponding spectacular decrease in the number of strongylid larvae present on the pasture herbage.

Discussion of the Possible Practical Implications of the Results of these Experiments

Since it is possible by the administration of daily one-gramme doses of phenothiazine to keep both the faecal egg count of horses and the larval count of pastures on which they are running at zero or at a very low level, for long periods, without the manifestation of symptoms of toxicity, the technique has possibilities in the control of equine strongylosis on self-contained studs and breeding establishments. Over a period of years it would, in theory, be possible to free both horses and pasture from strongylid infestation. To achieve this end in-foal mares would have to be placed on clean land and given daily doses of one gramme of phenothiazine, which could be conveniently incorporated in the food. This would result in a reduction of pasture contamination by the mares; and their foals, which would be free from strongylid worms at birth, could be reared practically, or perhaps even entirely, free from worms. A continuation of this process over a period of years coupled with removal of the infected mares to other establishments, would result in a significant reduction in the worm burden of horses on the stud and might eventually result in the establishment of a stud of horses free from strongylid worms.

In the series of experiments recorded in this paper, and in the previous one, only three animals were treated and they were dosed individually. It is possible therefore, that aberrant results may appear when larger groups of horses are treated and when the medicated food is prepared and fed in bulk. Under such conditions it is not easy to ensure that every horse eats its daily doses of phenothiazine, and one untreated horse in a group may vitiate the technique.

There are, also, a number of other difficulties of which horse owners should be aware before they use this method for the control of equine strongylosis. Although no signs of toxicity were observed in the horses in the present experiment it does not necessarily follow that more prolonged treatment would be equally free from hazard, or that working horses would not show toxic effects. Neither can it be stated with certainty that the small daily doses of phenothiazine would be harmless to in-foal mares or to the foetus, but experiments carried out by the writer on two mares showed that no ill effects followed treatment for a fortnight immediately before foaling and subsequently throughout the suckling period. There appear to be no records of abortion in mares following the administration of full therapeutic doses, and, indeed, Howell and Britten (1942) record the treatment of 35 pregnant mares, 25 of which were in the last three months of pregnancy, and 39 mares suckling foals from one to seven months old, without untoward effects. Pregnant goats (Habermann, 1943) and pregnant ewes (Habermann, Foster & Hummon, 1942) have been treated with full doses without harm, although Hungerford and Howe (1944) and Warwick, Turk and Berry (1946) record abortion in ewes following phenothiazine therapy. In the previous experiment, Gibson (1945), it was shown that the egg count is depressed for some 35 days after the end of a course of 30 daily one-gramme doses of phenothiazine and it would, therefore, be possible to reduce the hazard of toxicity by giving treatment every alternate month, but where such a course was adopted a closer check would have to be kept on the egg counts to ensure that treatment was effecting the reduction of egg count desired.

The control of equine strongylosis using small daily doses of phenothiazine may result in two other disturbing possibilities. The first is that prolonged sub-therapeutic dosage with phenothiazine may result in the appearance of a strain of phenothiazine-resistant worms, in a manner similar to that in which drug-fast strains of certain protozoa and bacteria have arisen. In such an event the technique would be rendered useless and also phenothiazine would be rendered ineffective for the anthelmintic treatment of horses carrying such resistant worms even if full therapeutic doses were given. The second danger is that an animal which is kept worm free may have no resistance to infection with the strongylid worms if it becomes exposed to infestation later in life, and it might be necessary to take great care to segregate such animals throughout their lives. Many records in the literature indicate that resistance to helminth infestation in adult animals is due to previous infestation, as well as age, and there may be some danger in completely depriving an animal of the early infestation that helps to confer resistance. It is hoped to carry out further experiments to obtain information on these important points.

Although the use of daily one-gramme doses of phenothiazine shows some promise for the control of equine strongylosis on self-contained studs, all the difficulties mentioned above should be clearly understood by anyone contemplating using the method and the advantages to be gained should be carefully weighed against possible untoward occurrences before a start is made.

Summary

Experiments are reported on the treatment of horses with daily one-gramme doses of phenothiazine for periods of a year without the appearance of symptoms of toxicity. In one housed horse and two horses at pasture the faecal egg count fell to a low level, or to zero, during the treatment period and for some six weeks afterwards. The larval infestation of the herbage also was reduced to a very low level on the paddock in which two of the horses were grazing.

The possibility of using this technique in the control of equine strongylosis is discussed and various difficulties which may arise when the method is employed in practice are pointed out.

Acknowledgments

I am greatly indebted to Dr. E. L. Taylor for his interest in this work and for his assistance in the preparation of this paper for publication.

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REVIEW

[Sheep Farming Annual. (1948.) Published by Massey Agricultural College, New Zealand. Price 10s. (N.Z. currency).]

This publication records in popular language a large number of papers presented to a Conference planned expressly for sheep farmers, and covers a very wide field. Of 27 papers, six only are predominantly veterinary in nature. Many are of mutual interest to all those concerned with the sheep industry and some are highly specialised and deal with problems of stock settlement in rough or unbroken areas and are of relatively little interest to veterinarians in this country.

The remarkable diversity of problems under investigation is evidence of the ever-growing importance of the sheep husbandry industry in our present-day world of agricultural economy.

While scientific readers would probably prefer to consider the original work in the appropriate journals, a perusal of the publication under discussion would not be without considerable interest.

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Also received : " Tablet Making." By Arthur Little and K.A. Mitchell. Pp. 121: Illus. 41. The Northern Publishing Co., Ltd., 37, Victoria Street, Liverpool, 1. Price 15s.

SOME ASPECTS OF THE EPIDEMIOLOGY OF BOVINE MASTITIS*

By

J. I. TAYLOR, PH.D., B.SC., M.R.C.V.S.,

Agricultural Research Council Field Station, Compton, Berks.

Now that penicillin therapy is so widely used in combating mastitis caused by *Str. agalactiae*, attention is passing from the treatment of the individual cow to herd eradication.

The success of eradication was not as great as might have been anticipated from the results obtained from the treatment of individual cows. Workers at Weybridge, as recorded by Dalling and Stableforth (1948), using 100,000 units of penicillin per quarter on five successive days, eradicated the organism from five of ten herds after the first course of treatment, and the incidence of infection was reduced considerably in the remainder of the herds. More extensive trials showed that *Str. agalactiae* was eradicated relatively easily from 50 per cent. of the herds and from a further 20 per cent. without serious trouble. The remaining 30 per cent. of the herds for various reasons resisted this scheme of eradication.

The results obtained from a similar scheme carried out at Compton, using 50,000 units of penicillin per quarter on four successive days, were comparable to those quoted above. Of ten infected herds, five were clear of infection six weeks after treatment and only three of these five remained free from infection when tested three and six months later.

The inability to eradicate the disease from certain herds became the subject of further inquiry and it is the purpose of these remarks to draw attention to the possible causes of these failures. As a result of this inquiry it became obvious that there are several important factors which may account for the difficulty in the eradication of the organism in these problem herds and it seems probable that more attention will have to be paid to the following four factors, which are, in their order of importance: (i) the individual cow, (ii) the milker, (iii) the preparation of the cow for milking and, (iv) the milking technique.

(i) The Individual Cow. (*a*) *The Udder.*—Little, Dubos and Hotchkiss (1941) have shown that cows with indurated udders are less likely to respond to treatment than those with few changes in the tissue, and Udall (1931) has stressed the importance of a systematic clinical examination of the udder. A careful inspection of the udders in a herd before treatment will enable one to make a more accurate prognosis (Udall, Johnson & Ferguson, 1943). An old cow with an indurated udder and a previous history of having had mastitis may prove a danger, not only by failing to respond to treatment, but also by acting as a carrier and reinfecting animals which themselves have responded to treatment. Before herd eradication can be successful, this type of animal must be removed. Before commencing treatment, therefore, it is necessary to make a clinical examination of all the cows and to dispose of those which have little chance in responding to the treatment. (*b*) *The Teats.*—Teat lesions have been held responsible for breakdowns in treatment (Edwards, Hughes & Taylor, 1948) and further work (Taylor, 1949) has shown

* Presented to the Royal Counties Division, N.V.M.A., at Reading, November 26th, 1948.

that as *Str. agalactiae* is capable of living in these lesions until they heal they must be regarded as true reservoirs of infection.

In experiments carried out on the skin of rabbits it was shown that *Str. agalactiae* was capable of surviving in wounds on the skin until those wounds healed, usually in about a week or ten days, but could not be recovered after healing. In contrast to this, with an experimental infection of the unbroken skin, *Str. agalactiae* was not recovered after a period of three hours. Similar findings were demonstrated in experiments carried out on the hands of laboratory workers, and also on cows' teats. Thus, *Str. agalactiae* behaves in a uniform manner on skin, whether it be that of a rabbit, a cow or a man. When the skin is unbroken the organism will disappear in a few hours, when a wound is present the organism will live in this until the wound heals. If the wound is not allowed to heal the organism will remain there for a long period.

Two other organisms which are associated with bovine mastitis, *Str. dysgalactiae* and *Str. uberis*, behave differently from *Str. agalactiae*. These organisms persisted for some days on dry skin and were recovered from the site of a wound not only until it had healed but from the site for several days afterwards.

These findings serve to emphasise the potential danger of teat lesions. They are capable of becoming infected and helping the organism to survive during a period when the udder is receiving treatment. The udder, after cure, may then become re-infected from the organisms in the teat lesions and so another breakdown occurs. It is of the greatest importance, therefore, not only to deal with teat lesions at the time of treatment, but also to point out to the farmer their significance in the spread of infection.

(ii) The Milker.—It is well known that *Str. agalactiae* can be recovered from the hands of milkers (Imperial Bureau of Animal Health, 1944), and Harrison (1941) has claimed that it can even adapt itself to become part of the resident flora of the hand. Although the writer has not so far found the organism so adapted on milkers' hands, it is common to isolate it more than 48 hours after the last milking. This, in itself, is dangerous enough, but coupled with the fact previously mentioned, that where there is a wound on the hand the organism can live until that wound has healed, it will readily be appreciated that the hands may play an important part, not only in spreading the organism in the cowshed but even in causing reinfections after treatment.

Thus, as far as the spread of mastitis is concerned, it is desirable for the hands to have as little contact with the teat as possible. This constitutes a great problem in a hand-milked herd and probably also arises in a machine-milked herd which is hand stripped. While some owners feel it essential to hand strip there are others who believe that stripping can be performed adequately by the machine.

(iii) The Preparation of the Cow for Milking.—The farmers' technique of preparation of the udder for milking has as its chief object the production of clean milk and Petersen (1944) demonstrated a similar technique designed to produce the maximum amount of milk. Both of these processes involve the washing of the udder and it is common to find that the teats are not only washed but left wet so that in a short time the teat surface becomes sodden and chaps and sores appear, followed by relatively large lesions. Before commencing treatment it may be necessary to devise some system which, while not interfering with clean milk production, will reduce the number of sores on the teats.

(iv) The Milking Technique.—During the milking, care must be taken to run the machine at the pressure and rate of pulsations recommended by the makers. Failure to do this throws an undue strain on the teats which may cause an eversion of the mucous membrane of the streak canal thus producing an easy pathway to the udder for any invading bacteria.

Great strain is also caused to the udder and teats by leaving the machine on the teats after the animal has been milked out.

In conclusion, then, it will be appreciated that herd eradication of mastitis is not merely a question of treatment of the organism in the udder but also involves attention to other factors some of which have been discussed in this paper, and failure to pay attention to these factors will undoubtedly lead to breakdown in herd eradication and disappointment with the present methods.

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Discussion

Mr. H. C. Shingler opened the discussion and thanked Dr. Taylor for a very interesting paper. He said that in his opinion it was very doubtful if the bacteria associated with mastitis always entered the udder via the teat canal: he was of the opinion that they entered via the mouth. If *Str. agalactiae* could be recovered from broom handles, light switches, etc., it only showed its widespread distribution—so it was probably all over the pastures. Why assume that it always entered via the teat canal? He instanced the case of one herd so badly infected with mastitis that the owner gave up milking and went in for beef production two years ago. This year a large number of the cattle developed enlarged pharyngeal and submaxillary glands. The Veterinary Investigation Officer was called in and established *C. pyogenes* infection. In another herd milked by an auto-recorder machine, a very marked improvement in the mastitis infection in the herd followed the removal of feeding troughs from the machine.

Dr. H. H. Holman asked if cows had been fed with infected material to see whether mastitis could be produced by this means.

Mr. A. C. Dixon asked how much attention should be paid to supernumerary teats and described trouble resulting from them in two herds. Were indurated udders the result of repeated infection or did induration predispose to infection? He also asked whether infection on the hands was susceptible to a routine surgical swab with alcohol.

Dr. Fraser wished to know if the term "clean herd" could be applied to a herd in which *Str. dysgalactiae* or haemolytic staphylococci were found. Was there any value in using penicillin in these infections of the udder? What was the significance of these organisms in relation to clinical mastitis and clean milk production? He would also like Dr. Taylor's opinion on the use of penicillin ointment as a hand- and teat-salve in control of sores on the teats.

Mrs. Howell described the recovery of *Str. agalactiae* from her hands one week after infection, although there were no abrasions.

Mr. I. C. Meikle asked if the use of sulphanilamide ointment on the hands was of any value to control infection.

Mr. N. P. Male enquired whether rubber gloves should be worn by milkers and by veterinary surgeons when sampling udders. He also asked—how does penicillin diffuse through the udder?

Mr. R. E. Ticehurst had not found penicillin very useful in the treatment of indurated udders and asked whether there was any more hope of a cure in the dry cow.

Mr. S. J. Edwards said the application of the therapeutic success obtained with sulphanilamide and penicillin in the individual animal to control infection within the herd had been developed rapidly. Notwithstanding the factors concerned with the wide distribution of *Str. agalactiae* that at one time seemed to militate

against any chance of success in control, it appeared that infection could be reduced to a low level and maintained as such in a fairly large proportion of herds by the simple application of therapy. But there were certain problem herds where the factors illustrated by Dr. Taylor played a dominant role in providing continued sources of infection. It was clear that cows with teats falling into the categories described by Dr. Taylor and also milkers' hands were chiefly responsible and while the latter could be eliminated as a source, it was not easy to deal with the cow with infected sore teats. Failures to therapy which could be attributed to this cause should be eliminated from the herd.

Prof. C. Formston was pleased to hear Dr. Taylor emphasising the importance of trauma due to distended udders, etc. He referred to the freedom from mastitis of the beef breeds of cattle.

Mr. F. R. Spratling asked for an explanation of sterile samples from inflamed quarters giving changed milk. He raised the question of the warranty of soundness of a cow's udder at a sale. In the old days it was quite simple but in these modern days should not the warranty be supported bacteriologically?

The Reply

In reply to Mr. H. C. Shingler, Dr. Taylor said that although *Str. agalactiae* could be recovered from a number of places, its life there was relatively short and the only places outside the udder in which it appeared to live and multiply were wounds, and these, to be infected, were generally confined to the teats and hands. There was a great deal of experimental work to suggest that *Str. agalactiae* infection is by the teat canal and not by mouth. All the remarks in the paper referred to *Str. agalactiae* and not *C. pyogenes*. Dr. H. H. Holman had raised the question of feeding infected material to cows, but when this had been done they did not develop mastitis nor could the organism be recovered from the udder. He agreed with Mr. A. C. Dixon that supernumerary teats could become infected with *Str. agalactiae* and quoted a case where the supernumerary teat was the only focus of infection in a herd; it infected the teat surface of the corresponding quarter. The infection was treated successfully with penicillin. In reply to Dr. A. C. Fraser, Dr. Taylor said that the term "clean herd" was generally applied to infections by *Str. agalactiae* causing the contagious form of mastitis. *Str. agalactiae* or haemolytic staphylococci generally caused only sporadic infections. He found that infections of *Str. dysgalactiae* responded to penicillin treatment but against haemolytic staphylococci no more than 50 per cent. bacteriological success could be expected with this treatment. In general, *Str. dysgalactiae* caused not more than five per cent. and haemolytic staphylococci five to ten per cent. of clinical mastitis. These organisms might cause a chronic infection so that in certain herds they might be widely distributed. The number of these udder pathogens was small compared to the total number of udder bacteria. They were unlikely to affect the keeping quality of the milk in the same way as *Str. lactis* or the coliform organisms. In answer to Mr. I. C. Meikle, sulphanilamide ointment was of doubtful value in controlling infection, especially where hypochlorites were used, as sulphur would be precipitated. In reply to Mr. N. P. Male, Dr. Taylor said that the cost of milkers wearing rubber gloves as a routine measure would probably be prohibitive, but in the case of veterinary surgeons the matter was different, as there was a danger of their spreading infection from herd to herd. They should, therefore, wear rubber gloves for sampling or infusing. There could be no doubt that penicillin did diffuse through the udder, as the results showed, but the rate and physical interaction between the penicillin and the udder had not been investigated directly. Replying to Mr. Ticehurst, promising results in eliminating the infection were obtained from treating dry cows with penicillin although the degree of recovery of indurated tissues depended primarily on the extent of the fibrosis. In answer to Mr. Spratling, normal changes in the milk might not be always due to an organism but might be physiological in origin. It would be impossible to warrant a cow's udder free from infection unless a bacteriological examination was made at the actual time of the sale.

"*The Veteran.*"—Many will wish to read what Mr. W. L. Weipers, the newly appointed Director of Veterinary Studies, has to say in his foreword to the summer issue of this magazine, on the prospective development of the Glasgow Veterinary School as an integral part of the University. The articles contained make sufficiently interesting reading but, as the Editor points out, the publication is dependent to such a degree upon extra-mural material that *The Veteran* already is in some danger of defaulting on its claim to be a college magazine. We support his appeal to students and staff to see to it that the reproach is removed forthwith by the provision of an adequate supply of articles from within the college.

A QUALITATIVE DIFFUSION METHOD FOR THE DETECTION OF ACETONE IN MILK

By

L. B. O'MOORE

Veterinary Research Laboratory, Department of Agriculture, Dublin.

Boddie (1933) and others have observed that the urine from clinically normal stall-fed cows may give a positive reaction to the Rothera test for the detection of aceto-acetic acid and acetone. Consequently this test when carried out on urine may give a result which is misleading to the clinician. Paterson (1945) showed that while the level of total ketones in urine frequently exceeded 15 times that of the corresponding blood, the level in milk approximated only one-half that of the corresponding blood. He suggested, therefore, that the Rothera test when applied to milk samples would be of value as an aid to the diagnosis of the condition described by Stinson (1928) as "bovine hypoglycaemic ketosis."

Of the compounds which appear in excess in the milk of cows suffering from ketosis, Paterson (1945) in a series of analyses estimated that on an average 70 per cent. was composed of "aceto-acetic acid plus acetone." The remaining 30 per cent. was βhydroxybutyric acid, a substance which cannot be detected by any simple qualitative test. Acetone itself forms a considerable proportion of the "aceto-acetic acid plus acetone" fraction and this proportion is increased if the milk is left standing, due to decarboxylation of aceto-acetic acid to acetone. While the Rothera test is specific for aceto-acetic acid it is much less so for acetone, so that the reaction becomes less intense if the milk has been kept for a few days. The procedure described here is specific for acetone and the keeping of milk for some days before testing does not minimise the intensity of the reaction.

The method, which is a modification of that of Fearon and Webb (1936), depends on the formation of a pale yellow precipitate on the diffusion and fixation of acetone in Nessler's reagent. It should be carried out at room temperature. A petri dish is laid on a black surface. In this 3 ml. of milk made acid with one drop of glacial acetic acid are distributed evenly round the circumference. A watch glass containing 2 ml. Nessler's reagent is placed in the centre of the petri dish, the cover being quickly replaced and the time noted. The presence of acetone in the milk is shown by the appearance of a pale yellow precipitate which first occurs at the periphery of the reagent in the watch glass and rapidly extends inwards. The rate of formation of the precipitate and its subsequent intensity depends on the concentration of acetone present.

Acetone in standardised aqueous solution added to normal milk showed that in concentrations down to 10 mg. per cent. the precipitate appeared at the periphery of the reagent within 1½ minutes. At 5 mg. per cent. precipitation occurred within three minutes while at 2 mg. per cent. a faint precipitate was detectable in about five minutes. Samples received by post from 12 definite cases of clinical ketosis all yielded precipitates in times varying from one to four minutes, while of 56 samples from clinically normal cows 54 showed no precipitation even after 12 hours and in the other two only a very thin film was apparent after four hours.

From this evidence a confirmation of ketosis would be

justified if a milk sample from a cow showing clinical symptoms yielded a precipitate within a few minutes. It should be stressed, however, that the concentration of acetone in the milk is not necessarily proportional to the severity of the clinical condition.

The results obtained in the small number of samples examined indicate that the method has a definite clinical value. It is both rapid and easy to carry out.

NESSLER'S REAGENT: 25 grammes mercuric iodide is ground up in about 100 ml. water and rinsed into a brown bottle. 15 grammes potassium idodide and 50 grammes sodium hydroxide are dissolved in water and are added to the mercuric iodide solution, the whole being made up to 250 ml. with water. A precipitate will settle within 24 hours when the clear supernatant fluid may be decanted off and stored in a brown bottle

It is essential that the bottle is kept well stoppered so that the reagent is not exposed to traces of ammonia in the atmosphere.

Acknowledgements are due to Messrs. O. Gleeson, M.R.C.V.S., Killarney, W. M. D. Hunter, M.R.C.V.S., Milford, and J. V. Marshall, M.R.C.V.S., Slane, for their co-operation in submitting milk samples from clinical cases of ketosis.

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BODDIE, G. F. (1933.) *Vet. Rec.* **13.** 1,128.
FEARON, W. R., & WEBB, D. A. (1936.) *The Analyst.* **61.** 539.
PATERSON, A. B. (1945.) *Vet. J.* **101.** 199.
STINSON, O. (1928.) *Vet. Rec.* **8.** 880.

ABSTRACTS

[Residual Arsenic and Strychnine in the Tissues of Drug-treated Cattle. HAM, W. E., KLINE, E. A., & ENSMINGER, M. E. (1949.) *Amer. J. vet. Res.* **10.** 150.]

Average daily doses of 0.357 gm. of arsenic trioxide and 5.69 gm. of nux vomica, sometimes used as stimulant drugs, were fed to heifers for two periods of 120 and 201 days' duration. Tissues were obtained for examination by biopsy from the biceps femoris or semitendinosus muscles, and at *post-mortem* examination from the liver, heart, kidney, eye and muscles from the twelfth rib, sirloin tip, and foreshank. Blood samples were taken during the first period but no significant changes in the blood pictures were observed.

No trace of strychnine was detected in any sample, which finding is in accordance with the generally accepted view that this alkaloid is rarely, if ever, found to be present outside the digestive tract.

Arsenic was found in the tissues, biopsy samples taken at the end of the 201 day period showing 12.67 parts per million and at the end of the 120-day period 4.21 parts per million. However, *post-mortem* samples taken at the same times showed that less arsenic than the 3.57 parts per million allowed by the Pure Food and Drug Regulations was contained in all the tissues examined. The high levels of arsenic found in the biopsies were possibly due to an excessively high blood level which was eliminated by bleeding during slaughtering, but arsenic determinations were not carried out on the blood.

From the combined data of both trials it was shown that by taking samples on the 20th and 41st days after feeding ceased, there was a progressive decrease in the arsenic content.

It is concluded that although the presence of dangerous residues of arsenic in meat is not likely, a period of cessation of treatment before slaughter should be recommended.

J. O. L. K.

* * * *

[The Pathogenesis of "Falling Disease." BENNETTS, *et al.* (1948.) *Austral. vet. J.* **24.** 237.]

Fourteen female calves and 14 cows grazed pasture which contained less than 3 p.p.m. Cu on a dry matter basis. Six of the calves were born on the Cu-deficient area during the late 1941 or early 1942. The remainder were transferred to the area within a few days of birth. During the years 1943 to 1946, three calves died, two of them of "falling disease" and the remainder were slaughtered at intervals during this period.

Seven of the adult cows received Cu supplements. Three cows in the unsupplemented controls, which had acted as such in a previous experiment, died of "falling disease."

Blood copper and Hb estimations were made on several occasions each year. In Cu-deficient animals and in normal controls, blood pyruvate levels were estimated. Seven cows in the experimental group and three normal control cows were used for electrocardiographic studies.

Pathological studies were made in all the calves and in two of the cows which died, together with Cu and other trace element estimations of liver and heart tissues.

The chief pathological change was a progressive myocardial atrophy proceeding to replacement with dense collagenous tissue. It was re-established that the immediate cause of death was heart failure consequent upon the cardiac lesions. The extent of the fibrotic lesions, however, did not necessarily determine the occurrence of heart failure and it is suggested that the distribution of the lesions is of greater significance. No new information was forthcoming suggesting the genesis of the cardiac changes. The biochemical data indicated that Cu alone was involved in the aetiology of the condition. Blood pyruvate levels were normal. Electrocardiograms were within the normal range, and did not demonstrate extensive fibrotic changes.

Seasonal Hb. levels were observed in the adult animals but were not observed in the calves until the first breeding season. Pregnancy and lactation are considered as contributing to the occurrence of seasonal anaemia.

S. J.

"RABIES IN AN IMPORTED DOG"

Commenting on the note, under the above heading, recently published in our columns, *Veterinary Medicine* (Chicago) observes in its July issue: "Since dogs, imported into the United States, are not subject to a rabies quarantine, it is common for American publications in the dog field to refer to the British regulations, imposing a six-month quarantine on dogs imported from the United States, as 'unsportsman-like.' The following quotation from *The Veterinary Record* (April 9th, 1949) is illustrative of the necessity for the British quarantine, if Britain is to maintain its freedom from rabies. Over the years the *Record* has contained a number of similar reports of cases of rabies developing during quarantine." (Here follows the quotation.) "It might be suggested to our dog industry that the control of rabies is not a sport and that British dog owners probably regard it as unsportsman-like on our part to fail to protect our dogs from this painful, fatal disease."

* * * *

The Manx Legislature has received reports on methods of selling agricultural products, including of course fat cattle, sheep, and pigs. One is issued by a committee of Tynwald presided over by Deemster Johnson, and recommends some changes in the grading of fat cattle, and a change in the method of allocation of animals to the different butchers. This, states the report, should be done by the Government veterinary surgeon, an independent person, rather than by a butchers' representative.—*Isle of Man Times.*

SUPPLEMENTARY VETERINARY REGISTER

Restriction of Practise of Veterinary Surgery by Unqualified Persons

NOTICE IS HEREBY GIVEN that the persons set out below, resident at and working at the addresses given below their names, and being persons without a veterinary qualification registrable on the Register of Veterinary Surgeons, have applied for registration on the Supplementary Veterinary Register.

The conditions for registration on the Supplementary Veterinary Register are that an applicant has attained the age of 28 and satisfies the Council of the Royal College of Veterinary Surgeons :—

(*a*) that he is of good personal character ;

(*b*) that during the ten years immediately preceding the application he has for a period of not less than seven years in the aggregate been engaged in the United Kingdom as his principal means of livelihood in diagnosing diseases of animals and giving medical or surgical treatment to animals :

Provided that the Council may authorise the registration of a person under this section who has been engaged as aforesaid during the said ten years notwithstanding that he has been so engaged for less than seven years in the aggregate if the Council are satisfied that the time during which he was so engaged was reduced by reason of his serving in His Majesty's forces or being engaged in work of national importance and that his registration would not be prejudical to the public interest.

Any person having any OBJECTION to the registration of any applicant or desiring to lay any information before the Council thereon should communicate with the undersigned at the Royal College of Veterinary Surgeons, 9/10, Red Lion Square, London, W.C.1, not later than 30 days after the publication of this notice, provided that an extension of the period for objection may be allowed if good cause be shown for such extension.

W. G. R. Oates,
Registrar.

Veterinary Surgeons Acts, 1881–1948.

The Third List of Names of Persons who have Applied for Registration

Number	*Name and Address*	*Place of Practice*
S.V.R. 229	Amsden, H. J., 70, North View Road, Hornsey, N.8.	P.D.S.A., 640, High Road, North Finchley, N.12.
260	Angel, W., 11, Silvermere Road, Catford, London, S.E.6.	127, Rye Lane, Peckham, S.E.15.
109	Apted, V. A., 55, Fellows Road, London, N.W.3.	8, Clifford Street, London, W.1.
80	Arnold, E., 51, Lower Gravel Road, Bromley	The Bromley Animal Hospital, 33, Bromley Common, Bromley, Kent.
114	Ball, A. C. P., 70, High Street, Ponders End, Middlesex.	The same address.
199	Bedford, H. J., 46, Randolph Road, Glasgow, W.1.	P.D.S.A., 5, Windsor Ter., Glasgow, N.W.
98	Brown, L. T., 83, Windermere Avenue, Elm Park, Essex.	P.D.S.A., Woodford Bridge Road, Ilford, Essex ; *and* 83, Windermere Avenue, Elm Park, Essex.
182	Burford, W. E., The House, P.D.S.A. Sanatorium, Ilford.	The same address.
116	Butler, L. M., " Crossways," Glentrammon Rd., Farnborough, Kent.	The same address.
59	Calastreme, H. L. A., 7, Chisholm Road, Croydon, Surrey.	The same address.
2	Casewell, J. B., Church House, Pontesbury, near Shrewsbury.	The same address.
248	Cremins, J., 87, Park Road, Ilford, Essex.	P.D.S.A., 226, High Rd., Leytonstone, E11
258	Dennis, L., Mrs., 52, Cross Street, Chatham, Kent	P.D.S.A., 121, The Brook, Chatham.
204	Dent, R., St. Clair, 74, Great Cloes St., Salford, 7, Lancs	406, Ashton Old Road, Manchester, Lancs.
12	De Relwyskow, E. J., 59a, Stapleton Road, London, S.E.5.	115, Camberwell Road, London, S.E.5.
S.V.R 262	Dickenson, C. R., 18, Princess Ave., Christchurch, Hants.	The same address.
176	Donaldson, G. J., 52, Putney Hill, London, S.W.15	P.D.S.A., 42a, Birkbeck Road, Acton, W.3.
23	Dorling, J. W., 45, Fleetwood Avenue, Westcliffe-on-Sea.	The same address.
183	Doutre, A. E., 33, Beverley Road, Hull.	The same address.
230	Drewe, K. I. S., " Wonnacroft," Callington, Cornwall.	The same address.
171	Drewe, R. H. T., " Wonnacroft," Callington, Cornwall.	The same address.
82	du Berrie, J., 7, Kingsmere Park, London, N.W.9	The same address ; and 371, North Circular Rd., London, N.W.10
242	Ellse, W. B., 119, Nottingham Road, Derby.	The same address.
1	Favell, J. W., 53, Bartlemy Road, Newbury, Berks.	The same address.
138	Fitzpatrick, V. V., 78, Redbridge Lane, Wanstead, London, E.11.	311, Barking Rd., Plaistow, E.13. P.D.S.A.
145	Forbes, E. M., " Craigview," Bridgend, Dalkeith.	20, South Street, Dalkeith ; and 61, Bridge St., Musselburgh.
189	Gaunt, S., Westfield House, 189, Healey Lane, Batley, Yorks.	The same address.
220	Gay, A., 11, Lapstone Road, Milton, Cumberland.	The same address.
225	Godbold, P. E., 52, Friars Street, Sudbury, Suffolk.	The same address.
72	Graham - Turnbull, D. (Miss), 143, Heaton Moor Road, Heaton Moor, Stockport.	The Kennels, Bower House, Fold Lane, Heaton Norris.
221	Griffiths, D. N., 88, Newquay Road, Catford, S.E.6	381, Lewisham High St., London, S.E.13.
130	Groves, W. E., 23, Victoria Road, Upper Parkstone, Dorset	Same address ; and 13, Gladstone Road, Boscombe, Hants.
19	Gutherie, T., Southcroft, Auchterarder, Perthshire.	The same address.
247	Hallam, D. J., 10, Brudenall Road, London, S.W.17.	The same address.
55	Harmer, L., 141, Southchurch Road, Southend-on-Sea.	The same address.
125	Hodges, E., 15a, The Cliff, Roedean, Brighton	P.D.S.A., 3, Montague Place, Brighton ; and P.D.S.A., 16, Oxford Street, Brighton ; and 82, High St., Hastings
26	Holl, E., Castle Hill, New Buckingham, Norwich, Norfolk.	The same address.
74	Holmes, R. H., " Greenside," The Green, Totteridge, N.20	The Totteridge Canine Hospital, Totteridge, N.20.
137	Kehoe, A., 33, Ripon Street, Gateshead	P.D.S.A., 67, High West Street, Gateshead ; and 71, City Road, Newcastle ; 30, Grange Rd., Jarrow.
153	Kerr, T. J. G., 184, High Road, London, N.W.10.	The same address.
168	Lloyd, R., 5, Velsheda Road, Shirley, Birmingham.	267, Stratford Road, Shirley, Birmingham.
14	Lloyd, W. B., Limefield, Bollington, near Macclesfield.	Same address ; and 34, Market Place, Macclesfield.
97	Mant, C. E., " Gedding," Storrington, Sussex.	Same address.
148	Marshall, R. A., 6, Westway, Raynes Park, S.W.20	National Canine Defence League Animal Clinic, 442, Garratt Lane, S.W.18.

S.V.R. 146	Morelli, K. G., Heather Bank, Walderslade, Chatham, Kent.	Same address; and 121, The Brook, Chatham, Kent.
224	Munro, W. T., 247, Wellington Road South, Stockport, Cheshire.	The same address.
211	Nicholas, J. W., 62, Park Road, Hounslow, Middx.	The same address.
227	Norris, D. A., 78, Redbridge Lane, Wanstead, London, E.11.	P.D.S.A., 226, High Road, Leytonstone, E.11.
159	Parker, R. F., 61, Daws Lane, Mill Hill, N.W.7.	The same address.
238	Philpotts, W. C., 212, Perry Rise, Forest Hill, S.E.23.	The same address.
241	Pickworth, W. H., 93, Bescot Road, Walsall, Staffs.	The same address.
252	Pritchard, R. M., Tyddyn Gwyn, Criccieth, Caernarvonshire.	The same address.
175	Ridler, V. F. W., 113, Ranelagh Ave., Ecceshill, Bradford.	Bradford and District Clinic, 95, Bolton Road, Bradford.
245	Romney, L. F., 427, Eastern Avenue, Ilford, Essex.	The same address.
249	Sanders, R. C., Grandison Villa, Pound Street, Moretonhampstead.	The same address.
120	Sanders, W. E. K., 1, Western Road, Crediton.	The same address.
250	Sanders, W. H., Grandison Villa, Moretonhampstead.	The same address.
186	Sidders, W. H. G., Woodview, Stubbs Cross, Ashford, Kent.	The same address.
49	Silver, S. John, 32, Bowring Park Rd., Liverpool, 14.	The same address
123	Smith, Charles N., The Limes, Wrentham, Beccles, Suffolk.	The same address.
136	Steele, C. M. A., 81, Raglan Court, Empire Way, Wembley.	P.D.S.A. Mobile Dispensaries.
144	Stevens, F. G., 99, Cemetery Road, Leeds, 11.	3, Dewsbury Rd., Leeds, 11.
240	Taylor, W. M., "Fernleigh," Oaken Lanes, Codsall, Wolverhampton.	P.D.S.A., 15, Bell St., Wolverhampton.
45	Thaxter, L. S. S., Animals Home, Drayton Road, Norwich.	The same address.
120	Thomas, T. Henry, 1, Clarence Gardens, Llandudno.	Jubilee Kennels, Jubilee Street, Llandudno, N. Wales.
126	Thompson, Andrew, 60, High Street, Dover, Kent.	91, London Road, Dover Kent.
256	Thompson, A. J., 70, Great Horton Road, Bradford, Yorks.	The same address.
255	Upton, E., "The Conifers," 27, Garrick Close, Walton-on-Thames.	180, York Way, King's Cross, London, N.7.
93	Walder, G. T., The Old Martyrs, Crawley, Sussex.	The same address.
103	Williams, Stanley, 18, Union Street, Leigh, Lancashire.	The same address.

Weekly Wisdom

". . . There is possibly no subject in connection with horses of more importance than their examination as to soundness and fitness; and I venture to assert that if the same spirit for specialism existed in our profession as obtains so conspicuously in the sister profession, we should have had a hundred workers in the field, each with his book, and that containing the same matter, in another form, of every other book on the same subject, embodying the one idea—too often forced—which has acted as the excuse for its author. . . ."
—From *Lectures on Soundness in Horses*, delivered in the [Royal (Dick)] Veterinary College, Edinburgh, during the summer of 1874, by Professor Fearnley, late Principal and Professor of Veterinary Surgery in the College. *Vet. J.* (1875.) **1**. 22.

IN PARLIAMENT

Transport of Calves

On the motion for the adjournment of the House of Commons on July 20th, Colonel Gomme-Duncan raised the question of the conditions under which calves are transported by rail in this country and the treatment which they receive. It concerned the Minister of Agriculture, the Minister of Food, the Minister of Transport, the Home Secretary and the Secretary of State for Scotland.

Frequently one was awakened at Crewe by the cries of these animals: rough handling in loading and unloading was all too common. The usual practice was for them to be tied or sewn up in sacking in which, in the first place, they were able to lie down comfortably, but in some cases they were put in the luggage van where there was no litter on the floor, and no foothold. He thought there was something very far wrong in a system which allowed them to be carried about the country in this way, or that it was necessary to send these creatures on such long journeys. On paper everything had been provided for by the Railway Executive in the matter of proper care, but in actual fact he did not think it was being carried out.

The Joint Under-Secretary of State for Scotland (Mr. Thomas Fraser), in reply, said that under the provisions of the Protection of Animals Act, 1911, which applied to England and Wales—and there was a similar Act of 1912 applying to Scotland—there were provisions prohibiting the conveyance or carriage of any animal in such a manner or position as to cause that animal unnecessary suffering, and that the Minister of Agriculture had, under powers given by the Diseases of Animals Acts, made certain orders containing additional provisions governing the carriage of calves, both by railway and road vehicles.

The fact that orders had been made and Acts of Parliament passed was perhaps not enough, and it would be wrong of any of them to insist that no unnecessary suffering or hardship was caused to young animals. Most of them would have seen these calves in the sacks in the railway stations from time to time, and would have wondered whether these young animals could only be transported in that way, or indeed whether they had to be transported at all. He had made enquiries from time to time, and had been told that most farmers, and most people knowledgeable in the treatment and care of calves, took the view that very young calves were better transported in sacks than otherwise, that thereby they were protected from chills, and so on, that they might contract on the journey.

A good deal of care was taken to ensure that no unnecessary suffering was caused in the railway trucks. He did not doubt there were cases of rough handling in transit. Facilities for feeding were not available at all stations, but Crewe was one of the places, he believed, where such facilities did exist. Many of the animals about which the hon. and gallant Member spoke were too young to eat any solid food; the only thing they could have was milk, and many were too young to take milk out of a bucket and had to be hand-fed, and he believed that a little of that was done at Crewe. But whether a feed of that kind at Crewe to a young animal travelling all the way from Somerset to Aberdeen was enough, he did not know.

"I should like (continued the hon. Member) to report to my right hon. Friend what the hon. and gallant Gentleman has said, to see whether there are any further steps we might take, in co-operation with the Railway Executive, to ensure that the least possible suffering is inflicted—or indeed no suffering at all, if it can be avoided—to these young animals while they are being transported. Most of the animals the hon. and gallant Member will have seen recently were being transported to be fed for beef in other parts of the country, rather than for slaughter under the jurisdiction of the Ministry of Food.

"There was a time not long ago when large numbers of young calves were transported long distances to slaughterhouses, but the Minister of Food sent out what I might call an injunction in January this year calculated to prevent the transporting of these very young animals long distances for slaughter. That injunction, together with the operation of the calf subsidy scheme, has reduced to the minimum, if it has not stopped altogether, the transport of very young calves long distances for slaughter. So I think we are concerned only with calves transported from the areas in which they are born and not being reared for beef, to beef-rearing parts of the country to be fed for slaughter some time later.

"We have certain powers at the present moment. We appreciate that there may still be some unnecessary suffering caused to these animals. I assure the hon. Member that my right hon. Friend is not unsympathetic to taking all practical steps in the circumstances to deal with any unnecessary suffering. With reference to the

present facilities at Crewe, my right hon. Friend will check up these and assure himself that they are being properly administered and that the necessary facilities are provided elsewhere where numbers of animals are passing through or being shifted from one truck to another for long journeys. I hope that with that assurance, the hon. and gallant Gentleman may care to leave the matter with my right hon. Friend."

NOTES AND NEWS

Diary of Events

Aug. 8th to 13th.—Fourteenth International Veterinary Congress, Central Hall, Westminster, and Church House, Westminster, London, S.W.1.

Aug. 9th.—Summer Meeting of the Society of Women Veterinary Surgeons, at Windsor (The Old House Hotel), 7.30 p.m.

Aug. 11th.—Last meeting of Council 1948-49 N.V.M.A., at Convocation Hall, Church House, Westminster, London, S.W.1, 11 a.m.

Aug. 12th to 15th.—Sixty-seventh Annual General Meeting and Congress, N.V.M.A., in London.

August 13th.—Fourteenth Annual Meeting of the Royal (Dick) Veterinary College Alumnus Association, at the Café Anglais, 20-21, Leicester Square, London, W.C.2, 1 p.m.

Aug. 15th.—Annual Meeting of the Association of Veterinary Teachers and Research Workers, Royal Veterinary College, N.W.1, 2 p.m.

Sept. 7th.—Meeting of the Southern Counties Division, N.V.M.A., at Salisbury, 6 p.m.

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CONDITIONS OF EMPLOYMENT OF YOUNG GRADUATES

We would draw the attention of intending advertisers in our "Appointments Vacant" column to the request made therein that the salary or salary range offered be stated in their announcements. This request is made in order that the Home Appointments Committee may acquire the evidence requisite for their consideration of the conditions of employment of young graduates, an enquiry in which the Committee is being seriously handicapped by the disappointing response met with hitherto. If, despite the Committee's appeal, any members are not prepared to respond through the medium of their advertisements they are urged, nevertheless, to make the desired information available by advising the Editor of the terms of remuneration offered.

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XIVth International Veterinary Congress

Reception at the Guildhall by the Royal College of Veterinary Surgeons

By kind permission of the Lord Mayor and Corporation of the City of London the Royal College of Veterinary Surgeons is to hold a reception in the historic surroundings of the Guildhall on Monday, August 8th, from 8.30 to 10.30 p.m.

So far as numbers allow it is hoped to be able to invite all members of the Congress and all ladies who are associate members of the Congress, as well as student members.

Tickets should be obtained at the Central Hall, Westminster, on Sunday, August 7th, on registering for the Congress, or early on Monday morning, the 8th.

The President and officers of the Royal College will receive guests and it is hoped during the evening to present the awards of Honorary Associate to certain distinguished commonwealth and foreign veterinarians.

By kind permission of the Curator the Guildhall library and museum will be open to the guests, and the Registrar of the Royal College is hoping to arrange an exhibition of charters and historical documents of the Royal College.

Dress for this reception will be "Evening Dress Optional."

The American Party Welcomed

Forty members, wives and children, of the American party, including Dean Hagan of Cornell University and Mrs. Hagan, arrived at Southampton on the *Queen Elizabeth* on Wednesday of last week. Their leader, Dr. D. M. Campbell, received on board a cablegram of welcome from the Royal College of Veterinary Surgeons, on behalf of British veterinarians, while the Registrar, Mr. W. G. R. Oates, was at Waterloo to greet them on their arrival at 1 a.m.

The Canadian Delegation

Dr. Chas. A. Mitchell, Dominion Pathologist, Dominion Department of Agriculture, Hull, Quebec, intimates that in attending the Congress he will be accompanied by Dr. F. Schofield, Ontario Veterinary College, Guelph, and Dr. T. Childs, Veterinary Director General, Dominion Department of Agriculture, Ottawa.

We learn from Dean Gustave Labelle, of the Quebec School of Veterinary Medicine, that it is the intention of Dr. Philodore Choquette, a member of the professional staff, to attend the Congress.

Animal Health in Britain

This is the title and the theme of a large display which is being prepared jointly by the Ministry of Agriculture and the Animal Health Trust. Designed specially for the Congress, this exhibit will show our visitors how the veterinary profession plays its part in livestock improvement schemes, in disease control and in the advisory and educational spheres; and how research stands behind the profession and supports its work in these ways.

The information is set out on charts giving the framework of the various schemes now in being. A background is provided by large photographic scenes of typical British countryside, featuring representative livestock. This section makes clear how the veterinary practitioner comes into the picture, and how (for example) Ministry of Agriculture Veterinary Inspectors, V.I.O. Centres and Veterinary Managers of A.I. Centres have their part to play. The work of the Animal Health Trust in the advisory and educational spheres is also indicated.

In the foreground is a dominating transparent feature, entitled "Research—to improve and develop all these schemes." Below this title are set out the main lines upon which research—both official (State-aided) and independent (voluntary)—is organised and conducted in this country.

In this section, visitors will be able to see how the Agricultural Research Council and the Ministry of Agriculture, with the Universities, etc., carry out "official" research; how the Animal Health Trust and various industrial firms supplement that work with their own Research and Veterinary Stations; and how the Trust—with the help of grants and donations from firms and other bodies—helps veterinary students and research workers by awarding Research Fellowships and Scholarships.

The exhibit incorporates shelves for literature, which will be available from the Ministry of Agriculture, the Animal Health Trust, the National Veterinary Medical Association and the Universities Federation for Animal Welfare.

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R.C.V.S. OBITUARY

Gardner, Walter, 28, Cassillis Road, Maybole, Ayrshire. Graduated Glasgow, May 20th, 1904. Died July 21st, 1949; aged 72 years.

In our last issue we recorded the death of Mrs. Gardner, and the sad association of the passing of the well-known Maybole practitioner, Mr. Walter Gardner, within a fortnight of his loss, will be doubly mourned by his colleagues in the profession and the community amongst whom they lived for so many years in Ayrshire.

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PERSONAL

Appointments.—The appointment in the Colonial Veterinary Service is announced of Mr. Douglas Munro Corbett, M.R.C.V.S., of the Department of Agriculture, Wellington, New Zealand, as Veterinary Officer, Tanganyika; also that of Mr. H. V. H. Morris, M.R.C.V.S., as Veterinary Officer, Windward Islands.

Birth.—Beaumont.—On July 14th, 1949, at Louth Hospital, to Joan (*née* Barker), wife of G. L. Beaumont, M.R.C.V.S., a son.

Marriage.—Letham—Newman.—On June 11th, 1949, quietly at Holy Trinity Church, Shaftesbury, John, youngest son of Mr. and Mrs. James Letham, 37, Hillhouse Road, Edinburgh, to Gertrude (Vickie), eldest daughter of Mr. and Mrs. Martin Newman, Rokeby, Salisbury.

Death.—Herrod-Taylor.—On July 19th, 1949, Rosemary Ann, only daughter of Mr. and Mrs. E. E. Herrod-Taylor, suddenly, at Warneford Hospital, Leamington Spa.

Polo at Roehampton.—Among the players in the final match of the Junior County Polo Tournament at Rochampton this month was Major C. Davenport, O.B.E., F.R.C.V.S., playing No. 1 for Ham. Major Davenport is in practice in Hampshire.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

XIVth INTERNATIONAL VETERINARY CONGRESS

Sir,—On the eve of the International Veterinary Congress I make an appeal to my veterinary colleagues in this country to become members of the Congress and to make every effort to come to London during the Congress week in order to meet the many veterinary surgeons from overseas who are attending the Congress. It is indeed a high honour to us that the Congress is being held in London and I am informed that we may expect large representations from many countries.

During recent years I have visited a number of countries and have been greatly impressed by the earnest wish of veterinarians to discuss their problems and to hear about our work in this country. A Veterinary Congress provides an excellent opportunity for exchanges of views and for strengthening our relationship with colleagues from other parts of the world. In my view, it is the duty of all of us to do whatever we can to maintain and foster our common interests. Personal contacts are desirable wherever possible: an opportunity is presented for such contacts during the Congress. The more of us who become members of the Congress and who attend the meetings, the better will be the results. Do let us show that we welcome this opportunity to meet our colleagues from all over the world.

Yours faithfully,
T. Dalling,
President of the Royal College of Veterinary Surgeons.

10, Red Lion Square,
London, W.C.1.
July 23rd, 1949.

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TESTICULAR NEOPLASM ASSOCIATED WITH SEX INVERSION IN THE DOG

Sir,—I have read in your columns the interesting article by Messrs. Daykin and Smythe and Mr. Hogg's comments thereupon. I feel care must be exercised in attributing to one factor, such as formation of oestrogen in the testicle, the clinical manifestation of hormonal disturbances.

Mr. Hogg relates Mr. Holroyd's experiences in this field. Like Mr. Holroyd, I have noted that when there is an ectopic testicle (generally a seminoma), it is usually combined with alopecia, and that when the testicle is removed surgically, growth of hair is restored.

As recorded by me in the Dutch Small-animal Journal, a year ago I had experience of a dog with atrophy of the testicles, alopecia and swelling of the posterior mammae, with milk secretion. N. V. Organon determined for me the 17 ketosteroids in the urine. They seemed to be normal (figures for the dog are limited) and he proposed treatment with D.O.C.A. (cortical hormone).

Milk secretion stopped, the mammae became smaller and the testicles larger; growth of hair was restored and the animal became brighter. One mamma was removed surgically for examination (cystadenoma); the other presented the same, somewhat smaller, clinical appearance. After each injection a haematoma developed; this ceased, however, after the sixth injection, when the dog became normal with the exception that one mamma remained swollen. Three months later the dog's condition had deteriorated, but there was a good response to the implantation of one tablet of D.O.C.A. Ten months later the dog died, following a renal haemorrhage. Section showed that the kidneys were normal, but that the adrenals were hypertrophied.

Initial treatment with pregnl and neo-hombreol failed.

Clearly, the mechanism of hormonal treatment is not so simple as we are inclined to believe. Sometimes we may achieve results with one or other of the hormones, but this is due merely to general stimulation of the hormonal system.

Yours faithfully,
E. J. Voute.

Small-animal Clinic,
Rozengracht 226, Amsterdam.
July 12th, 1949.

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SPECIES OF *LYMNAEA* AS INTERMEDIATE HOSTS OF *F. HEPATICA*

Sir,—In connection with the letter "*Lymnaea stagnalis* as an intermediate host of *Fasciola hepatica*" which you reprint in your issue of July 9th, 1949, it may be of interest to record that we have now observed complete development of the intramolluscan stages of *F. hepatica* in *Lymnaea glabra* and *L. palustris* as well as in *L. stagnalis* and the more usual vector *L. truncatula*.

Using a technique by which newly hatched snails are exposed to the mass attack of large numbers of the fully active *miracidia* of *F. hepatica*, a high proportion of these other species of *Lymnaea* may become infected. The observation suggests the interesting possibility that specific resistance of snails to infection with miracidia is not as absolute as superficially appears but depends upon the conditions of infection and the state of the host at the time of infection.

From the veterinary point of view it is important to note that even *L. truncatula*, which is very highly susceptible to infection at all stages of growth, is, in the field, seldom parasitised to the extent of more than 5 per cent. or 6 per cent. of the population. Since the susceptibility of the other species of *Lymnaea* seems to be limited to the few days after hatching it is unlikely that an important proportion of a field population will become infected.

All available evidence suggests that field measures against the molluscan vectors of *F. hepatica* can with safety be limited to the control of *L. truncatula*.

Yours faithfully,
S. Brian Kendall.

Ministry of Agriculture and Fisheries.
Veterinary Laboratory,
New Haw,
Weybridge, Surrey.
July 21st, 1949.

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DEMODECTIC MANGE

Sir,—I remember several years ago having a yard man who was a Bob Tailed Sheep dog fancier—the Old English Sheep dog—and one day he brought to me one of his show bitches which had an area of about four square inches in the middle of the back affected with demodectic mange. He asked me to take the skin off that area to stop the disease from spreading. I had never done such a thing before but I obliged him. I examined the section carefully and found the mites under the skin in the sound areas. From my examination I came to the conclusion that this mite burrows under the skin and comes to the surface here and there, simulating the moles in the fields, and that consequently treatment was virtually impossible.

Until we know more about the life history of this parasite I fear our treatment will never be satisfactory.

Yours faithfully,
G. C. Lancaster.

Eastwick House, Evesham, Worcs.
July 17th, 1949.

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THE QUACK "QUALIFIES"

Sir,—This district seems to have more than the average number of the unqualified. Twice during the last few months I have heard from reliable sources that one of these persons recently "went to London and qualified." At the moment the evidence is only hearsay, but should more definite facts come to light it would be interesting to know what the reactions of the Council might be.

It would also be interesting to know if this is an isolated case or if the public, for whose protection the latest Veterinary Surgeons Act was designed, is being similarly misinformed in other parts of the country.

Yours faithfully,
G. Mason.

42, North Bar, Banbury, Oxon.
July 16th, 1949.

[On enquiry from the Registrar, R.C.V.S., we are informed that no individual has yet been placed on the Supplementary Register. Furthermore, after compilation of this Register no individual so registered is entitled to refer to himself as being qualified.—Editor.]

Advertisers' Announcements

Change of Address

As from July 25th, 1949, the address of Roussel Laboratories, Ltd, will be 4, Golden Square, London, W.1. Telephone: GERrard 3111-2.

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'Wellcome' Procaine Penicillin Intramammary Injection

Burroughs Wellcome & Co., 183-193, Euston Road, London, N.W.1, have added 'Wellcome' brand Procaine Penicillin Intramammary Injection to their range of intramammary products. While trials with procaine penicillin are still proceeding, veterinary surgeons may wish to add to their experience by assessing the place of this preparation in the treatment and control of streptococcal mastitis in the field by giving only two injections at an interval of two or three days. 'Wellcome' Procaine Penicillin Intramammary Injection is issued in single dose tubes, each containing 100,000 units of procaine penicillin with aluminium stearate in oil, in boxes of 12. Veterinary surgeons may take up the new product in existing contracts, in conjunction with, or in place of, ordinary penicillin intramammary. Information about special quantity prices is available on request. Substantial price reductions have been effected for all quantities of 'Wellcome' Penicillin Intramammary Injections.

The attention of veterinary surgeons is drawn to the fact that all 'Wellcome' Penicillin Intramammary Injection products *deliver* the stated dose. The certainty of this is effected by the presence of the pad of sterile soft paraffin at the base of the tube. This pad acts as a piston, sweeping the full dose of penicillin into the udder.